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NOTES AND LITERATURE

The Chondriosomes as Bearers of the Hereditary Qualities.—

Meves, in a paper entitled, "Die Chondriosomen als Träger erblicher Anlagen"¹ presents a new and interesting view in regard to the bearer of the hereditary qualities. Since Hertwig, '75, reached the conclusion that fertilization consists in the union of male and female pronuclei, the nuclear theory of heredity has been criticized by many able investigators, and the new interpretation which Meves gives at this time indicates that many are still dissatisfied with the all-sufficiency of the theory, and are eagerly seeking and grasping, as it were, the first visible sign of any other substance which may serve to carry the hereditary qualities.

Meves finds in the chick embryo, between the second half of the first and the first half of the fourth day of incubation, by means of special fixing and staining reagents, a large number of independent threads, fibers, rods or granules. The shape of these structures varies in different cells and at different times in the same cell, although they are all one and the same substance. He concludes that these structures are identical with the "Cytomikrosomen" of la Valette St. George, the "Mitochondrien" of Benda and the "Chondriokonten" of Meves, and proposes to unite them under the term "Chondriosomen." He also believes that the granules of Altmann, except those produced by regents, are identical with the chondriosomes. They have been described by Benda, Meves and others in various tissue cells, plant cells and in sex cells. Benda, '03, suggested that possibly the mitochondria might play a rôle in heredity, and with this suggestion Meves agrees.

Nägeli's idioplasm hypothesis and many other similar theories have been advanced to account for heredity, but these have been criticized on the ground that they lack a material substratum, and that they are purely speculative. Meves believes that the "fantastic structure," as it was called by Sachs, has now become a reality in the chondriosomes. While Nägeli supposed the idioplasm to produce different differentiated products by

¹ *Archiv für Mikroskopische Anatomie und Entwicklungsgeschichte*, Bd. 72, 1908.

special activities on the surrounding cytoplasm, Meves believes that the differentiated parts arise by a direct metamorphosis of the chondriosomes.

Meves realizes that the nuclear substance answers fully the demands of a hereditary substance, namely, that in fertilization the two parts must be equivalent, that there must be a reduction, and that there must be an equal division in cleavage. However, he says that it has not been proved that the nuclear substance and hereditary substance are identical, or that the nuclear substance is the only hereditary substance. He then asks the question, how far do the chondriosomes satisfy conditions demanded of a hereditary substance. It is evident that the quantity of chondriosomes present in the egg cell is much greater than that brought in by the sperm. This fact, he says, presents no great difficulty, if we suppose that the specific qualities of the chondriosomes becomes expressed through the configuration of transverse sections. According to Nägeli, an over-supply of idioplasm may be thrown out from the idioplasmic system at the time of fertilization and become changed into yolk. In favor of this view Van der Stricht and his students have shown that a part of the mitochondria of the egg cell are changed into yolk granules.

There is also the possibility that the male chondriosomes, after entrance into the egg, multiply and divide. There is not an equal division of the chondriosomes in cell division, as there is of the choromatin, but they do approximate to equality of division and any difference may be made good by increased growth.

As there is a reduction of the chromatin before fertilization, Meves suggests that there may be a reduction of the chondriosomes. However, he has not seen even the slightest indication of a reduction, and until some evidence is forthcoming, such a suggestion must remain as a mere speculation. Duesberg, '07, has shown that there is a mass reduction of the chondriosomes in the two spermatocyte divisions, but in the egg this is not true, as the chondriosomes remain scattered throughout the cell, and the resulting cells are very unequal in size.

Meves suggests another way to prevent the increase in the hereditary mass, and this is as Nägeli has shown. Nägeli supposes the male and female idioplasm to unite as a mixed product. A cross section through the union of the embryonic strands shows that the idioplasm strands, in relation to the number of micellæ rows, remains unchanged. A paternal and maternal idioplasm

thread in fertilization, then, must unite end to end to form one of double length. While Meves ascribes a large part in the transportation of hereditary qualities to the chondriosomes, he does not claim that they alone, to the exclusion of the nucleus, carry these qualities. He thinks that both nucleus and cytoplasm work together, the qualities of the nucleus being carried by the chromosomes, those of the cytoplasm by the chondriosomes.

F. PAYNE.

Cultural Bed-Mutations in the Potato.—E. Heckel¹ has reared the white-flowered *Solanum maglia* from tubers received from Sutton and from Vilmovin. The young plants resembled perfectly typical *S. maglia*. They were transplanted from the greenhouse to a fertile garden where common potatoes had been grown the year previously. The tubers obtained differed greatly from those planted and those characteristic of this species. They weighed from ten to twenty times as much. One in particular weighed 135 grams; the flesh instead of being watery and slightly bitter as it typically is, was compact and full of starch—the tuber was edible. This tuber being planted gave, the next year, five tubers from 87 to 62 grams in weight. The other tubers (of smaller size) yielded tubers of from 50 to 5 grams—the smallest having the size of the typical tubers of *S. maglia*. The author refers to the large potato obtained by him from *S. maglia* as a mutation, but suspects that its size may have been influenced by the previous growth in the same soil of the common tubers.

¹ *Ann. des Faculté des Sci. Marseille*, XVI, 1907.